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(54) **Synthetic fibre rope: monitoring strain using optical fibres**

(57) The proposed method depends on the inclusion of a number of monitoring optical plastic fibres during manufacture of the rope such that they form an integral and continuous part of its construction. Their properties are such that when subjected to the high local strains associated with internal and otherwise undetectable damage to the rope, their optical conductivity is destroyed or reduced, and this provides a warning of impairment.

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SPECIFICATION

Strain limit indicator for monitoring internal failure in synthetic fibre ropes

Synthetic fibre ropes sometimes break without warning because the early signs of failure are hidden by outer layers of braid. Breakage however does not occur in all strands simultaneously, but may be delayed for some time after the failure of the first. The proposed method of indicating high levels of local straining in individual strands could give warning of imminent rope failure. The method depends on the inclusion of a number of monitoring fibres (or wires) of suitable material during manufacture of the rope such that they form an integral and continuous part of its construction. The properties of these monitoring fibres are chosen in relation to the mechanical characteristics of the rope such that they break when subjected to the high local strain associated with internal damage to strands or fibres of the rope. Indication of breakage in these monitoring fibres can be obtained either by measurement of their electrical resistance or by fibre optical techniques. This operation may be facilitated by connecting the fibres together at one end so that the measurement can be made from one end alone.

CLAIMS (Filed on 18th Nov., '83)

1. The inclusion of one or more plastic fibre optic cables, sheathed or unsheathed as an integral part of the construction of any type of synthetic fibre rope, for the purpose of monitoring excessive local straining in the rope as indicated by changes in the optical transmission properties of the fibre.

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